Patient Education and Counseling 137 (2025) 108827

Contents lists available at ScienceDirect

Patient Education and Counseling

journal homepage: www.journals.elsevier.com/patient-education-and-counseling

"What if you were the patient?" A mixed methods study on improving hospital workers' awareness of the patient experience through virtual reality

Hafize Demirci [a,c,d,*,1], Noureddine Achbab [b], Judith Weeda [b], Eva van de Korput [b], Iris Dekker [b], Anne M. Eskes [a,d,e], Marlies P. Schijven [a,c,d,*,2]

[a] Amsterdam UMC Location University of Amsterdam, Amsterdam, the Netherlands
[b] Amsterdam UMC Location Vrije Universiteit Amsterdam, Surgery, Amsterdam, the Netherlands
[c] Amsterdam Gastroenterology and Metabolism, Amsterdam, the Netherlands
[d] Amsterdam Public Health, Digital Health, Amsterdam, the Netherlands
[e] School of Nursing and Midwifery, Griffith University, Australia

ARTICLE INFO

Keywords:
Patient satisfaction
Patient perspective
Awareness
Hospital worker
Virtual reality movie
Hospital visit

ABSTRACT

Objective: A hospital visit can be stressful and challenging for patients. Understanding the patient experience is crucial for improving care. The main purpose of this study is to gain insight into whether the use of a Virtual Reality (VR) movie about the patient journey through the hospital enhances hospital workers' awareness of patients' experiences and influences their behaviour.

Methods: A mixed methods study was conducted at Amsterdam UMC, the Netherlands. The study used qualitative, and quantitative methods to evaluate the impact of the VR movie "Through the Eyes of the Patient". Inclusion criteria were employees of Amsterdam UMC, regardless of role. Exclusion criteria included epilepsy, severe dizziness, or physical limitations affecting VR use. Participants had to complete an evaluation form with both closed and open-ended questions. Data were analyzed using thematic and statistical methods to evaluate the effectiveness of VR in increasing awareness of patients' experiences and influencing their behaviour.

Results: A total of 194 hospital workers participated in the study. For the qualitative analysis, data from 171 participants were utilized. Five main themes emerged from the thematic analysis: (1)Evoking emotions; (2) Change of perspective; (3)Regard for the patient; (4)Call for actions; (5)Virtual Reality as an appropriate tool. More than half of the participants acknowledged that the VR movie improved their understanding of the patient experience during a hospital visit or outpatient stay. The mean rating for the VR movie was 8.4 (SD 0.88).

Conclusion: Based on the results of our research, the VR movie 'Through the Eyes of the Patient' appears to be effective in raising awareness among hospital employees. VR technology has proven to be a valuable tool to achieve this.

Clinical implications: VR is an accessible tool for engaging many employees, making it a valuable addition to formal healthcare training and orientation programs for new hospital workers.

1. Introduction

Over 421 million of patients are admitted in over 160.000 hospitals per year, worldwide [1,2]. A hospital visit can be a challenging experience for patients and their loved ones [3]. Depending on the healthcare need, patients interact with an average of 17–26 workers [4]. While doctors and nurses are the most visible, the 'invisible workforce'—such as cleaners, ICT staff, and administrators—also plays a key role in patient satisfaction and safety [5,6]. To provide good care, it is essential to understand what worries the particular patient, and also what may

* Correspondence to: Department of Surgery, Amsterdam Gastroenterology and Metabolism, Amsterdam Public Health, Digital Health, Amsterdam UMC, University of Amsterdam, Amsterdam, the Netherlands.
E-mail addresses: h.demirci@amsterdamumc.nl (H. Demirci), m.p.schijven@amsterdamumc.nl (M.P. Schijven).
[1] ORCID ID: 0000–0001-7208–707.
[2] ORCID ID: 0000–0001-7013–0116.

https://doi.org/10.1016/j.pec.2025.108827
Received 17 December 2024; Received in revised form 1 May 2025; Accepted 6 May 2025
Available online 10 May 2025

comfort or help him or her in the patient journey. In recent years, awareness of the importance and understanding how patients experience the quality of services they receive in a healthcare facility has much increased [3]. The patient's perspective is now better recognized and emphasized as a very important factor to understand, both in medical and nursing education, and by various methods [7,8]. To gain such insight hospitals frequently use patient experience monitors using questionnaires [9]. This one-way approach indeed helps to better understand patients' experiences during a hospital visit and offers insights for adapting local policies.

However, it is debatable to what level hospital workers really understand the impact of being a patient in their hospital -if they have not lived through this experience themselves [10,11]. It is important to have some understanding on how patients' mind and body travel in a patient journey, and what challenges patients encounter during their hospital journey [10,11]. Better understanding often results from real experience 'being on the other side', e.g. in the hospital scenario for hospital workers to be a patient in that hospital [11,12]. But of course, we do not envision or aim to change our healthcare workforce into patients -merely for better understanding. An immersive approach, perceiving healthcare as if to look through a patients' eyes, has the potential to create real awareness. By using Virtual Reality (VR) technology and glasses, a 'patient experience' can be provided to those caring for patients, transcending traditional teaching methods. Research shows that VR provides a more immersive experience, improving engagement, comprehension and learning outcomes compared to 2-dimensional (2D) videos. Despite a higher cognitive load, 360° VR, also 3-dimensional (3D), videos improve procedural performance, learner satisfaction and self-efficacy [13].

The main aim of this study is to gain insight into whether the use of a VR movie about the patient journey through the hospital enhances hospital workers' awareness of patients' experiences and influences their behaviour, both in the acute care setting as on the patient wards. Second, whether this VR tool is considered as an effective tool for this purpose.

Our hypothesis is that a VR movie will make hospital workers more aware of the patient experience, leading to a better understanding of their perspective and a greater appreciation of their challenges, emotions and needs, ultimately leading to more empathetic and patient-centered care.

2. Methods

2.1. Theoretical framework

The rationale for using VR in this research is based on several complementary theoretical perspectives that explain VR's unique potential as a medium, particularly for patient-embodied experiences. VR offers a level of immersion and sensory engagement that traditional media cannot provide, making it particularly suited for simulating lived experiences from a first-person perspective [14]. The theory of experiential learning (Kolb, 1984) states that meaningful learning occurs through direct experience and reflection, which VR can uniquely facilitate by allowing users to 'step into the shoes' of the patient [15]. This is supported by studies by Asoodar et al. and Gasteiger et al. showing that VR can significantly improve learning outcomes in healthcare education [14,16]. Asoodar et al. emphasize that VR activates multiple sensory channels, stimulates emotional engagement, and promotes deeper cognitive processing [14]. Gasteiger et al. further highlight the importance of contextual alignment, suggesting that VR is most effective when the content is closely aligned with the learner's professional environment and previous experience [16].

2.2. Study design and ethics

A mixed methods study was conducted, combining a qualitative research approach with survey-based quantitative data collection. A convergent design was used, in which quantitative and qualitative data were collected independently and then integrated during analysis to reach a comprehensive conclusion. On December 15, 2022, the first participants were included and on September 21, 2023 the last. The study was approved by the regional medical ethics review committee of Amsterdam University Medical Center (Amsterdam UMC), the Netherlands (ref no: W22_457 # 23.005). Each participant gave informed consent completing a digital informed consent form. The qualitative part of this study is reported according to the applicable Consolidated criteria for REporting Qualitative research (COREQ) checklist (Appendix S1), and the Statistical Package for the Social Sciences (SPSS) version 26.0 (IBM Corp., Armonk, New York) for the quantitative questions [17]. Quantitative results were summarized through descriptive statistics. The VR movie premiered on October 11, 2022.

2.3. Setting, participants, and recruitment

This study was conducted in Dutch at Amsterdam UMC, one of the largest university hospitals in the Netherlands, with 19,500 employees. Inclusion criteria included being an employee of Amsterdam UMC, regardless of the type of role/function/department. Exclusion criteria encompassed individuals with epilepsy, severe dizziness, and physical limitations hindering the use of VR goggles and headphones. All Amsterdam UMC employees were informed via the hospital's intranet, where they received a notification inviting them to watch the VR movie. Employees had the option to register for a session individually or with their respective working groups. For sample size, a pragmatic epistemological approach was taken Creswell and Plano Clark, which supports the integration of quantitative and qualitative methods to ensure both generalisability and depth [18]. A large sample size was a pragmatic choice, deemed necessary to ensure statistical power, generalisability and rich qualitative insights. Our aim was to recruit 200 participants to capture both breadth and depth - quantitative data that provide an overview, while qualitative insights add contextual richness. This approach is consistent with best practice in mixed-methods research, where large samples have been used in similar ways to explore patients' perspectives [19].

2.4. Procedure and research team

The VR movie was offered to groups with a maximum of 15 participants. Each session was led by the project team, existing out of three employees who were involved in scripting the movie scenario (J.W., E. K., I.D.). The sessions had a consistent structure. The study was conducted by a dedicated research team consisting of H.D. (medical doctor), and N.A. (medical student), who conducted the data analysis under the guidance of two senior researchers, A.E. and M.S both of whom have expertise in qualitative and quantitative research. These researchers are affiliated with the same hospital conducting research on the application of VR in healthcare. However, they have no formal conflicts of interest, and did not participate in the intervention themselves.

2.5. VR movie 'Through the eyes of the patient'

The VR movie was produced as part of a quality improvement project for hospital use. The team that primarily developed the film consisted of a quality advisor with a background in patient participation and nursing, a project manager working in the hospital, an expert by experience, and a communication advisor. The script, written by E.K., J.W., and I.D., is based on real patient cases and experiences from the Patient Experience Monitor (PEM), a tool developed to assess patient experiences and stimulate quality improvement [9]. The themes in the movie reflect common patient feedback from the PEM. To ensure accuracy, the script was reviewed by patients and healthcare professionals. After finalizing

the script, the scenes were shot in Dutch and the VR movie produced, without a pilot phase. The movie was shot in 3D, 360 degrees (VR Gorilla®) [20]. The volunteering actors in the movie are all employees of Amsterdam UMC. The VR movie consisted of two parts: 'the clinic journey' and 'the outpatient journey'. The movie focuses on the patient journey through the hospital. Since many admitted patients also visit the outpatient clinic in the hospital, the movie includes both inpatient and outpatient services to provide a comprehensive representation of the entire patient journey within the hospital. For more details on the content of the VR movie, see Table 1, Figs. 1, 2.

2.6. Data collection and evaluation form development

After completing the VR session, a team-debriefing session took place exchanging thoughts, emotions and also talking about what they got out of the session to improve their individual roles as being a health care provider or a worker in the hospital. Participants were sent an email containing a link to the evaluation form. This evaluation form included both closed and open-ended questions. Open-ended questions were used to gain insight into various aspects of the patient journey, with the goal of achieving the primary research objective. Closed-ended questions were conducted to further clarify the findings to gain a better understanding of the qualitative data. Initially, pilot sessions were used to test the pre-developed evaluation form and minor adaptions were made after pilot testing. Additionally, we also collected some baseline characteristics of the participants including age, gender, and role/function in the hospital. We could trace which participant, with which role, provided the responses. Finally, we asked the participants to rate the VR movie overall on a scale of 0 (very poor) to 10 (very good). Three open-ended questions were included:

1. Describe your initial reaction to the movie in a few sentences? (maximum 50 words)
2. Which moment from the movie touches you the most and why? (maximum 50 words)
3. After seeing the movie, what will you do differently tomorrow? (maximum 50 words)

For the following four statements, participants were given response options: strongly agree, agree, neutral, disagree, strongly disagree:

1. The VR movie increased my awareness of the experiences patients have when being admitted in the hospital
2. The VR movie increased my awareness of the experiences patients have when consulting the outpatient clinic
3. I feel that the addition of VR to the movie is powerful in raising and enhancing awareness considering the patient journey in the hospital
4. I would recommend watching the VR movie to my colleagues

The evaluation form took a total of 5–10 minutes to complete. Data collection stopped once data saturation was reached.

Table 1
Content of the VR movie *'Through the eyes of the patient'*.

Part 1 **''The Clinic Journey''**	Part 2 **''The Outpatient Journey''**
Illustrates viewers lying in an ambulance being awake and injured, when being swiftly transported to the trauma room. There, they experience what it's like to receive critical care, undergo an ultrasound, and actually enter a CT scanner, similar to what happens in trauma care settings, surrounded by numerous healthcare providers. Finally, the clinic journey concludes with a scene in the nursing ward, where the patient experiences numerous visitors coming to their bed, including various healthcare providers. They are also woken up at night for medication rounds and to have their vital signs checked. See Fig. 1.	Illustrates the patient's struggle with the arduous process of navigating through the hospital to reach the outpatient clinic after admission, starting in the parking garage. During the visit, the patient endures waiting times, undergoes initial screenings and blood tests, and consults with various healthcare providers, including medical interns, resident doctors, and specialists. As part of the process in an academic hospital, they first recount their medical history to the medical intern, then to a physician or resident, and finally to the specialist. See Fig. 2.

2.7. Data analysis

2.7.1. Qualitative data

Thematic analysis was conducted, following the guidelines outlined by Braun and Clarke (2006), to explore how the VR intervention affected participants' understanding of patient experiences [21]. The thematic analysis was carried out by two independent researchers (H.D. and N.A.) using the structured approach consisting of the following steps: 1) (re) reading all transcripts to gain familiarity with the data; 2) initial coding; 3) generating themes; 4) reviewing themes; 5) defining and naming (sub)themes; and 6) producing the report [21]. Throughout the process, an experienced senior researcher in qualitive research (A.E.) provided supervision. Data analysis was facilitated using MAXQDA 2022 VERBI Software [22]. Themes were derived inductively from the data, and participants were not involved in providing feedback on the findings.

2.7.2. Quantitative data

Quantitative analysis was conducted with SPSS by two independent researchers (H.D. and N.A.). In this study, descriptive statistics were utilized. We calculated the average age and number of male participants, and categorized the participants by their roles. For normally distributed continuous variables, the mean and standard deviation (SD) were used, while for non-normally distributed variables, the median and interquartile range (IQR) were used. Categorical variables were expressed as frequencies and percentages.

3. Results

A total of 1134 participants watched the VR movie, of which 800 participants, whose email addresses were known, were invited to participate in the study. The remaining participants had taken part in groups where only one person's email address was available. A total of 194 participants responded, and wanted to participate and completed the online evaluation form (24 %). In the qualitative analysis, responses of 171 participants were included to achieve a sufficient level of data saturation. Five main themes emerged from the thematic analysis: (1) Evoking emotions; (2) Change of perspective; (3) Regard for the patient; (4) Call for actions; (5) Virtual Reality as an appropriate tool. Subthemes were also identified within these main themes (Fig. 3).

3.1. Theme 1: evoking emotions

3.1.1. Confronting

For some participants, the movie presented proved to be rather confrontational, serving as a mirror that reflected their work environment from the patient's perspective. This was true for healthcare employers but also for supporting and administrative staff.

'' The movie creates a good, confrontational picture of the experience of patients.'' (Nurse, P2)

3.1.2. Loneliness and vulnerability

Participants reported experiencing feelings of loneliness at different times when being in the VR environment. This, even when they were virtually surrounded by many people in the VR scenery (such as the part when being in the emergency room); as well as being surrounded with others in real life -watching the VR movie simultaneously. Loneliness and feelings of vulnerability were reported about the movie fragment

Fig. 1. Screenshots of scenes from the clinic journey.

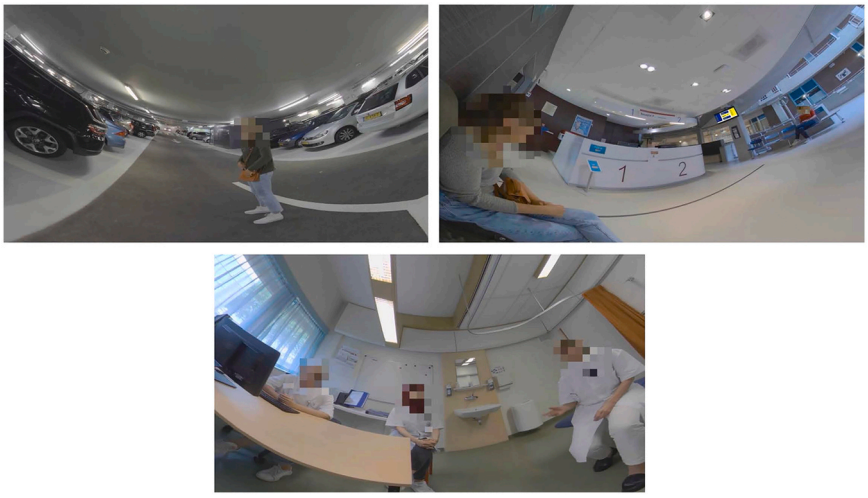

Fig. 2. Screenshots of scenes from the outpatient journey.

that was featuring the quiet, dark and rather long period of being alone, in a strange hospital bed during the night.

> *"Although you understand that urgency is required and you have to endure it, this was the part where I felt very lonely and it really hit me."* (Nursing chief, P137)

3.1.3. Helplessness, lack of control, and frustration

Participants experienced feelings of helplessness and frustration when being a virtual patient. They felt being entirely at the mercy of others -with no control over their circumstances. What particularly struck them was the multitude of 'mental hoops' they had to jump through – virtually being in different departments, with a multitude of opinions of clinics, people and staff – leading to frustration and confusion. Especially frustrating was witnessing the process of a patient repeatedly telling the same story to a medical student, then again to a physician assistant, and once more to a medical specialist.

> *"An intense feeling of powerlessness, frustration and even anger. All sorts of things happen to you whilst having no-say when undergoing it! I didn't like it at all."* (Secretary, P139)

3.1.4. Anxiety

Uncertainty and lack of knowledge being a virtual patient often led to feelings of anxiety. Participants indicated that the experience of being a patient—from the ambulance ride and emergency room reception to hospitalization and undergoing tests—provoked significant arousal and anxiety. Some even reported having physical sensations associated with it (higher pulse, feeling agitated).

> *''How frightening it can be to hear that you are in the shock room. I believed I was going to die.''* (Management, P9)

3.1.5. Recognition and memory

The movie evoked memories in several ways. Some hospital employees were reminded of the impact of their professional conduct and the challenges they face in their regular work. In addition, for some the movie brought back personal memories of times when they themselves had been real patients.

> *"Having been in the same situation myself as a patient as in the first movie-after the accident I had been taken by ambulance to emergency room. For me, everything was very realistically presented as déjà vu"* (Volunteer, P157)

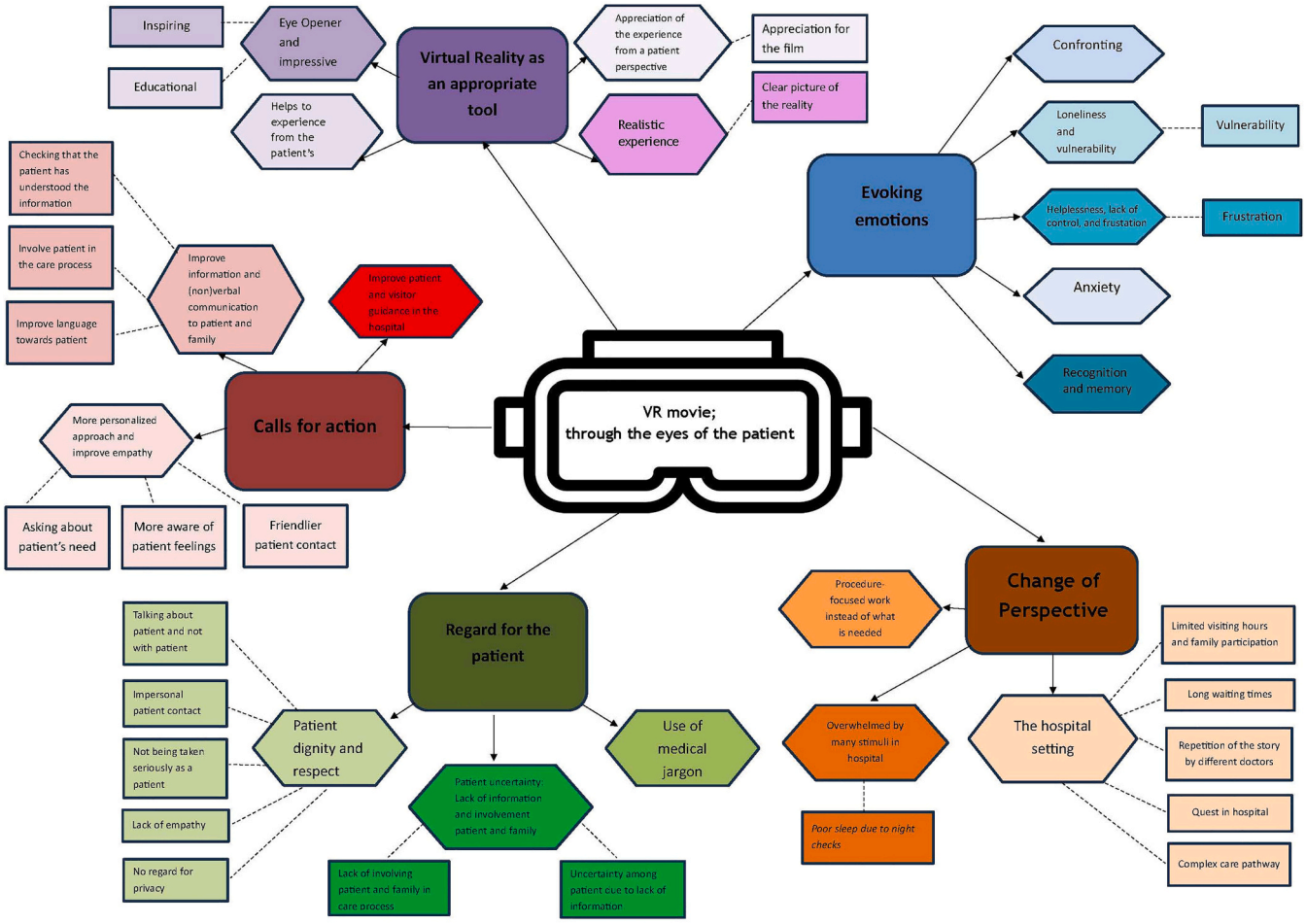

Fig. 3. Thematic diagram.

3.2. Theme 2: CHange of Perspective

3.2.1. The hospital setting

The movie gave participants a better understanding of what it can be like, visiting the outpatient clinic. Employees were struck by the patient journey, including long wait times, the need to repeat their story to multiple doctors, lack of decision support and family participation, difficulty in navigating the hospital and to experience limited visiting hours.

> *'' That the patient comes to the outpatient clinic and has to tell the same story three times to three different doctors.''* (Nurse, P2)

3.2.2. Overwhelmed by many stimuli in hospital

Many participants reported that there are a great number of hospital workers all standing around the patient, especially when entering the trauma room and also, a white crowd flocking the bedside when doctor's visits are on the wards. This creates a sense of being overwhelmed. Participants report feeling of being unease, over-asked and report feeling over-stimulated. Additionally, participants noted that patients are frequently woken up for checks during the night, which disrupts their sleep.

> *'' It seems frightening to suddenly end up in a hospital where a lot is happening around you without any clarity about what will happen and what exactly is going on''.* (Medical student, P1)

3.2.3. Procedure-focused work instead of what is needed

Several participants observed that the work in hospitals has become more procedural, focusing on following established protocols rather than addressing the specific needs of the patient. They indicated that as a society we risk hiding behind these procedures instead of doing what is really needed for individual care.

> *'' And that moment – I have experienced it myself – when someone abruptly pulls open the hospital curtain with a "Good morning!" – then you really feel like you're just part of a system rather than the focus of care.''* (Team leader, P58)

3.3. Theme 3: regard for the patient

3.3.1. Patient dignity and respect

Most participants indicated that the contact with the healthcare professional felt rather impersonal and often, they did not feel taken seriously. They noted that discussions were more about the patient rather than with the patient, indicating a lack of empathy. In addition, participants noted that the presence of another patient in the same room compromised privacy, as sensitive conversations could easily be overheard.

> *'' The moment during the grand rounds when the doctor talks about the patient, but not to the patient! As a patient, you are already vulnerable, and feeling ignored in this way makes things even more challenging.''*(-Other, P146)

3.3.2. Use of medical jargon

Participants highlighted the common use of medical jargon, which often confuses patients, leaving them unsure of their condition and lacking clarity about their health status.

3.3.3. Patient uncertainty: Lack of information and involvement patient and family

Participants noted that both the patient and their family are minimally involved in the process. They indicated that while there is communication with the patient, it primarily serves to briefly explain what the hospital worker is going to do, often in technical terms. For example, procedures may be mentioned without explaining the rationale behind them.

''It's about the patient; the patient and their family are not really involved in the process, and explanations or clarifications about the situation and what has been or will be done are not communicated to the patient.'' (Management, P5)

3.4. Theme 4: call for actions

3.4.1. Improve information and (non)verbal communication to patient and family

Participants mentioned that after watching the VR movie, they believe they will act more consciously during their future interactions with patients. It was repeatedly emphasized that the participants were determined to improve the process of providing information to both patients and their families.

"Setting up improvements with my team to provide patients and families with even more and better information." (Nursing Chief, P5)

3.4.2. Improve patient and visitor guidance in the hospital

After watching the movie, many participants indicated that they were more aware of lost or disoriented patients and visitors in the hospital. Participants expressed an intention to pay more attention to these patients and visitors.

''Being more attentive when patients wander through the building and helping them find their way sooner will be a focus for me. In projects, improving accessibility will be higher on my priority list.'' (Management, P69)

3.4.3. More personalized approach and improve empathy

The desire to increase patient empathy and a more personalized approach was frequently mentioned. Participants also emphasized the need to inquire more about patients' needs to better involve them in the care process.

"Talk even more with the patient instead of about the patient. And ask the question: 'how are you and how is this for you?' Starting the conversation, 'what do you need as a patient in the hospital besides medical care'. Paying attention to the psyche." (Team leader, P122)

3.5. Theme 5: virtual reality as an appropriate tool

3.5.1. Eye opener and impressive

Participants mentioned that they found both the VR technology and the VR movie impressive. They described the VR movie as inspiring and eye-opening, appreciating the opportunity it provided to gain a unique perspective from the patient's point of view."

"I found it impressive how through VR glasses you can really experience what a patient is going through." (Medical student, P2)

3.5.2. Appreciation of the experience from a patient perspective

Some participants found it helpful to experience hospital care from the patient's perspective. They noted that the VR movie shifted their point of view from that of a hospital employee to that of a patient, beautifully depicting the patient's experience.

''Confronting and vulnerable to be a patient! Very good to experience this once and to experience what it is like to be a patient. As already known, very important to see that not only expertise but also the involvement and empathy of caregivers are very important.'' (Specialized nurse, P129)

3.5.3. Realistic experience

Participants indicated that the VR movie to be gripping and realistic, providing a reflection of what it's like to see our work environment from the patient's perspective. They found it very special and lifelike, as if they were truly experiencing the patient's perspective themselves.

''The realism of this technique is amazingly realistic and regularly gives the feeling of actually being there.'' (Volunteer, P6)

3.5.4. Helps to experience from the patient's perspective

Participants indicated that the movie helped them empathize with the patient and his family and that the movie was instructive in this regard. They also stressed the importance of putting yourself in the patient's shoes, emphasizing that ultimately everything should be about the patient and how this perspective can be further integrated.

"The initial reaction is quite overwhelming. You are placed in a scenario that is just like the real world, because of the VR. As a result, you get emotionally involved quickly and easily." (Consultant, P70)

3.6. Quantitative results

The participants were mostly female and consisted of various positions within the hospital workers (see Table 2). Mean rating for the VR movie was 8.4 (SD 0.88) on a rating scale of 10. Over half of participants agreed or strongly agreed that the VR movie increased their awareness of the patient experience during a hospital visit or outpatient stay. Fig. 4 shows the results of the four statements.

Table 2
Demographics and characteristics.

	Total participants (n = 194)
Mean age, years	55,7
Male, n(%)	51(26)
Function in the hospital, n(%)	
1. Nursing chief / Team leader/ Project leader	10(5)
2. Nurse/Specialized nurse/Physician assistant	28(14)
3. Paramedic	14((7)
4. Non-specialist Doctor/ Medical Resident / Medical specialist	18(9)
5. Medical student/ Nursing student	7(4)
6. Management	16(8)
7. Staff / Consultant / Board of directors/Supervisory board	24(12)
8. Support service	20(10)
9. Finance	14(7)
10. Researcher	8(4)
11. Volunteer	11(6)
12. Other	24(12)

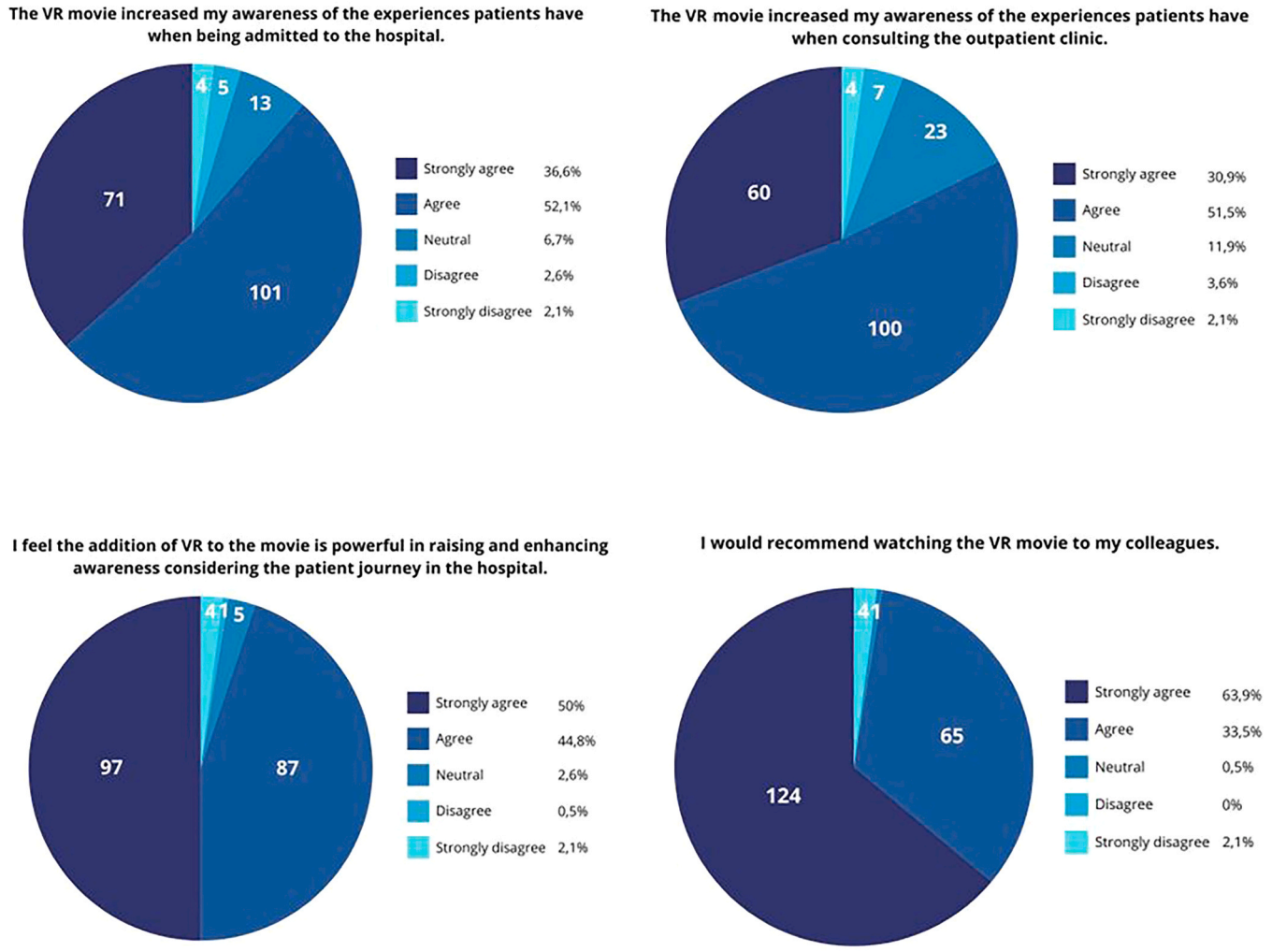

Fig. 4. Results of the closed ended questions.

4. Discussion and conclusion

Based on our study results, the VR experience appeared to influence hospital workers' awareness of patients' experiences and was viewed as an effective tool for this purpose, according to the feedback gathered from participants. Almost all participants recommend the VR experience to their colleagues. This is reflected in the evaluations, with the VR experience receiving an average rating of 8.4. The results of the quantitative and qualitative analyses were aligned. The quantitative data confirmed the trends and patterns observed in the qualitative findings, while the qualitative insights added depth and context to the statistical outcomes. This convergence strengthened the reliability of the conclusions and underscored the added value of employing a mixed-methods approach in this study. We must emphasize that the VR movie 'Through the eyes of the patient' is neither a promotional movie nor is it intended to portray the hospital in a negative light. The scenarios depicted in this movie represent impactful situations that may occur in any hospital.

The patient experience is recognized worldwide as an independent dimension of health care quality[23]. According to Oben et al., there is no universal understanding or standardized definition of the "patient experience," leading to different interpretations among patients, clinicians, policy makers, managers and researchers [23]. This lack of clarity hampers the ability to provide, measure and improve the patient experience and highlights the need for a clearer understanding to guide clinical practice, research, quality improvement and policy [23–26]. For that, we first need to understand the fundamental concepts of the patient experience And what better way to do so than by virtually becoming the patient ourselves? Simulation-based training, in VR and in non-VR settings is already being offered to medical students as well as non-healthcare professionals to help better understand patients [27–29]. A scoping review by Karvelyte et al., which examined healthcare professionals learning from the simulation of patient illness experiences, included 77 studies [29]. Notably, 50 % of the studies simulating dementia utilized VR in the Virtual Dementia Tour [29].

What was lacking to date, is an immersive experience not only about dealing with a certain disease or illness, but about being a patient having to deal with the hospital system as a whole. Hence, our VR movie was not intended to simulate a patient's illness. It was meant to represent the experience of a patient being in the hospital and having to deal with an often challenging hospital environment.

This, to raise awareness of the patient journey in the hospital among hospital workers.

Immersive virtual reality, which allows people to experience situations from another person's perspective, offers significant opportunities to counteract the decline of empathy and improve clinical practices [30, 31]. Our study further demonstrates that VR is an effective tool for enhancing awareness and empathy among hospital workers. Moreover, the VR movie 'Through the eyes of the patient' encouraged hospital workers to take proactive actions, as reported by the staff themselves, in the form of providing clearer information to patients and assisting them with navigation within the hospital. This finding aligns with the study by

Ahmadzadeh et al., which investigated whether watching a film about patient-physician interactions, either alone or combined with a communication skills training workshop, could improve the empathy scores of medical students [32]. Their results indicated that watching selected films, such as 'The Doctor', significantly but temporarily enhanced students' empathy [32]. However, they concluded that combining film viewing with a communication skills workshop resulted in more substantial and lasting improvements. Ogston-Tuck et al. also conducted a study on understanding the patient perspective by seeing through someone else's eyes in films, specifically for students. A total of seven films were selected, covering a range of genres including animation, foreign films, documentaries, biopics, and Hollywood dramas [33]. Ogston-Tuck et al. concluded that the educational potential of film comes from its visual nature, which connects to real-life experiences of different ages, cultures and backgrounds [33]. Films can effectively convey values and foster respect for different cultural perspectives on illness and reality. However, in both the studies by Ahmadzadeh et al. and Ogston-Tuck et al., the films were presented in 2D, without the use of a VR headset or 3D technology [32,33]. Additionally, the films used were pre-existing and did not necessarily present the perspective of the patient.

The importance of patient-centered care is further stressed by Kwame et al. [34]. They indicate that providing care services that respect and address the needs of patients and their caregivers is critical to achieving positive care outcomes and perceptions of care quality, thus defining patient-centered care [34]. In our study, several participants observed that the work in hospitals has become more procedural, focusing on following established protocols rather than addressing the specific needs of the patient. They indicated that, as a society, we are at risk of hiding behind these procedures instead of doing what is truly necessary for individual care. This recognition by healthcare workers, increasing their awareness, may fuel an important shift in changing the system.

Some limitations of our study should be mentioned. First, the identification and analysis of themes can be influenced by the researcher's perspective, due to the interpretive nature of thematic analysis. To mitigate this, the data was evaluated by two independent reviewers, and a third independent researcher reviewed their evaluations to enhance trustworthiness and credibility. Second, our questionnaire was not validated, as no appropriate validated questionnaires exist to evaluate the effects of a VR movie for healthcare professionals. The primary purpose was exploratory; the questionnaire was designed to capture context-relevant insights rather than function as a standardized measurement instrument. We recognize that the lack of formal validation is a limitation and recommend psychometric testing in future studies to ensure reliability and validity. Third, we did not measure the long-term effects of the VR movie, such as its influence on patient care or policy. Although 3D appears to be effective, we did not compare it to a normal 2D version of the VR movie which may have the same effects. Fourth, the high percentage of female participants may have influenced the results. However, this reflects the reality in the Netherlands, where more than 80 % of healthcare providers are women, making our sample representative [35]. In addition, the inclusion of age range and ethnicity could have provided more insight, although we believe this omission does not affect our core findings.

4.1. Conclusion

The VR experience with the movie 'Through the eyes of the patient' improves hospital workers' awareness and appreciation of the hospital patient's experience, both in the acute care context and on patient wards. In this study, VR technology proved to be an valuable tool for creating this awareness. The experience aroused emotions among the hospital workers, changing their mindsets and encourages them to take deliberate actions to support patients more from a patients' perspective.

4.2. Practice implications

Based on the results of our study, the VR movie seems to be effective in creating awareness among hospital workers. The VR experience was positively evaluated. Using realistic, scenario-based VR movies could also help other hospitals improve the understanding and appreciation of patient experiences among hospital workers, ultimately leading to better patient-centered care. However, it is important to recognize that further research is needed to assess the long-term effectiveness of this VR movie. Nevertheless, it is an accessible tool for reaching many employees, and therefore, we believe it has the potential to be incorporated into formal healthcare training. We recommend that it be included in orientation programs for new hospital workers. In addition, a follow-up VR experience could be developed in which viewers can make personal choices about how to handle different situations, such as dealing with an aggressive patient, adding more interactivity. This film could include different scenarios, including patients who have language barriers and feel misunderstood. And lastly, we would like to encourage other organizations caring for people in vulnerable situations, to follow our approach.

CRediT authorship contribution statement

Eskes Anne M.: Writing – review & editing, Supervision, Methodology. **Dekker Iris:** Project administration, Investigation, Funding acquisition, Conceptualization. **Schijven Marlies P.:** Writing – review & editing, Supervision. **Weeda Judith:** Project administration, Investigation, Funding acquisition, Conceptualization. **Achbab Noureddine:** Writing – original draft, Visualization, Methodology, Investigation, Formal analysis. **Demirci Hafize:** Writing – original draft, Visualization, Methodology, Investigation, Formal analysis, Conceptualization. **van de Korput Eva:** Project administration, Investigation, Funding acquisition, Conceptualization.

Funding

This work was supported by the Amsterdam UMC, innovation impulse grant.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.pec.2025.108827.

References

[1] Discovery ABA. (n.d.). Hospital statistics and facts. Discovery ABA. [Accessed 10 February 2025]; 2025 Available from: ⟨https://www.discoveryaba.com/statistics/hospital-statistics-facts/⟩.
[2] The World Health Organization. (n.d.). Patient safety. [Accessed 10 February 2025]; 2025. Available from: ⟨https://www.who.int/news-room/facts-in-pictures/detail/patient-safety⟩.
[3] Gupta D, Rodeghier M, Lis CG. Patient satisfaction with service quality as a predictor of survival outcomes in breast cancer. Support Care Cancer 2014;22(1):129–34. https://doi.org/10.1007/s00520-013-1956-7.
[4] Whitt N, Harvey R, McLeod G, Child S. How many health professionals does a patient see during an average hospital stay? N Z Med J 2007;120(1253):U2517.
[5] Cross S, Gon G, Morrison E, et al. An invisible workforce: the neglected role of cleaners in patient safety on maternity units. Glob Health Action 2019;12(1):1480085. https://doi.org/10.1080/16549716.2018.1480085.
[6] Bergey MR, Goldsack JC, Robinson EJ. Invisible work and changing roles: health information technology implementation and reorganization of work practices for the inpatient nursing team. Soc Sci Med 2019;235:112387. https://doi.org/10.1016/j.socscimed.2019.112387.

[7] McIlvried DE, Prucka SK, Herbst M, Barger C, Robin NH. The use of role-play to enhance medical student understanding of genetic counseling. Genet Med 2008;10 (10):739–44. https://doi.org/10.1097/GIM.0b013e318187762e.
[8] Khalife J, Ekman B, Ammar W, et al. Exploring patient perspectives: a qualitative inquiry into healthcare perceptions, experiences and satisfaction in Lebanon. PLoS One 2023;18(8):e0280665. https://doi.org/10.1371/journal.pone.0280665.
[9] Bastemeijer CM, Boosman H, Zandbelt L, Timman R, de Boer D, Hazelzet JA. Patient experience monitor (PEM): the development of new short-form picker experience questionnaires for hospital patients with a wide range of literacy levels. Patient Relat Outcome Meas 2020;11:221–30. https://doi.org/10.2147/PROM.S274015.
[10] Kennedy BM, Rehman M, Johnson WD, Magee MB, Leonard R, Katzmarzyk PT. Healthcare providers versus patients' understanding of health beliefs and values. Patient Exp J 2017;4(3):29–37.
[11] Kim EJ, Koo YR, Nam IC. Patients and healthcare providers' perspectives on patient experience factors and a model of patient-centered care communication: a systematic review. Healthcare 2024;12(11). https://doi.org/10.3390/healthcare12111090.
[12] Galletta M, Piazza MF, Meloni SL, et al. Patient involvement in shared decision-making: do patients rate physicians and nurses differently? Int J Environ Res Public Health 2022;19(21). https://doi.org/10.3390/ijerph192114229.
[13] !!! INVALID CITATION !!! [13–17]
[14] Asoodar M, Janesarvatan F, Yu H, de Jong N. Theoretical foundations and implications of augmented reality, virtual reality, and mixed reality for immersive learning in health professions education. Adv Simul (Lond) 2024;9(1):36. https://doi.org/10.1186/s41077-024-00311-5. published Online First: 20240909].
[15] Kolb DA. Experiential learning: experience as the source of learning and development. Englewood Cliffs, NJ: Prentice Hall; 1984.
[16] Gasteiger N, van der Veer SN, Wilson P, Dowding D. How, for whom, and in which contexts or conditions augmented and virtual reality training works in upskilling health care workers: realist synthesis. JMIR Serious Games 2022;10(1):e31644. https://doi.org/10.2196/31644.
[17] Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. Int J Qual Health Care 2007;19(6):349–57. https://doi.org/10.1093/intqhc/mzm042.
[18] Creswell JW, Plano Clark VL. Designing and conducting mixed methods research. 3rd edition. SAGE Publications; 2018.
[19] Cone PH, Giske T. Hospitalized patients' perspectives on spiritual assessment: a mixed methods study. J Holist Nurs 2021;39(2):187–98. https://doi.org/10.1177/0898010120965333.
[20] Unknown. VR Gorilla. [Accessed 6 March 2024]; 2024. Available from: ⟨https://www.vr-gorilla.com/nl/⟩.
[21] Braun V, Clarke V. Using thematic analysis in psychology. Qual Res Psychol 2006;3 (2):77–101. https://doi.org/10.1191/1478088706qp063oa.
[22] VERBI Software. MAXQDA 2022 [computer software]. Berlin, Germany: VERBI Software; 2021 [Available from: maxqda.com].
[23] Oben P. Understanding the patient experience: a conceptual framework. J Patient Exp 2020;7(6):906–10. https://doi.org/10.1177/2374373520951672.
[24] Larson E, Sharma J, Bohren MA, Tuncalp O. When the patient is the expert: measuring patient experience and satisfaction with care. Bull World Health Organ 2019;97(8):563–9. https://doi.org/10.2471/BLT.18.225201.
[25] Gleeson H, Calderon A, Swami V, Deighton J, Wolpert M, Edbrooke-Childs J. Systematic review of approaches to using patient experience data for quality improvement in healthcare settings. BMJ Open 2016;6(8):e011907. https://doi.org/10.1136/bmjopen-2016-011907.
[26] Adams C, Walpola R, Iqbal MP, Schembri A, Harrison R. The three pillars of patient experience: identifying key drivers of patient experience to improve quality in healthcare. J Public Health 2024. https://doi.org/10.1007/s10389-023-02158-y.
[27] McNally G, Haque E, Sharp S, Thampy H. Teaching empathy to medical students. Clin Teach 2023;20(1):e13557. https://doi.org/10.1111/tct.13557.
[28] Han A, Kim TH. A simulation-based empathy enhancement program for non-medical care providers of older adults: a mixed-methods study. Psychiatry Investig 2021;18(2):132–9. https://doi.org/10.30773/pi.2020.0290.
[29] Karvelyte M, Rogers J, Gormley GJ. Walking in the shoes of our patients': a scoping review of healthcare professionals learning from the simulation of patient illness experiences. Adv Simul 2021;6(1):43. https://doi.org/10.1186/s41077-021-00194-w.
[30] Elzie CA, Shaia J. Virtually walking in a patient's shoes-the path to empathy? Med Sci Educ 2020;30(4):1737–9. https://doi.org/10.1007/s40670-020-01101-0.
[31] Wijma EM, Veerbeek MA, Prins M, Pot AM, Willemse BM. A virtual reality intervention to improve the understanding and empathy for people with dementia in informal caregivers: results of a pilot study. Aging Ment Health 2018;22(9): 1115–23. https://doi.org/10.1080/13607863.2017.1348470.
[32] Ahmadzadeh A, Esfahani MN, Ahmadzad-Asl M, Shalbafan M, Shariat SV. Does watching a movie improve empathy? A cluster randomized controlled trial. Can Med Educ J 2019;10(4):e4–12.
[33] Ogston-Tuck S, Baume K, Clarke C, Heng S. Understanding the patient experience through the power of film: a mixed method qualitative research study. Nurse Educ Today 2016;46:69–74. https://doi.org/10.1016/j.nedt.2016.08.025.
[34] Kwame A, Petrucka PM. A literature-based study of patient-centered care and communication in nurse-patient interactions: barriers, facilitators, and the way forward. BMC Nurs 2021;20(1):158. https://doi.org/10.1186/s12912-021-00684-2.
[35] de Statistiek Centraal Bureau voor. Care sector has the most female workers. 2024. ⟨https://www.cbs.nl/en-gb/news/2024/35/care-sector-has-the-most-female-workers⟩.